

Teaching Drug Sciences through ODL: The BRAOU Experience

Prof. Ramachandraiah Gorrepati*

Professor and Head, Dept of Chemistry

Dr. B.R. Ambedkar Open University, Hyderabad, Andhra Pradesh, India

Skill Development

Skills development for national development

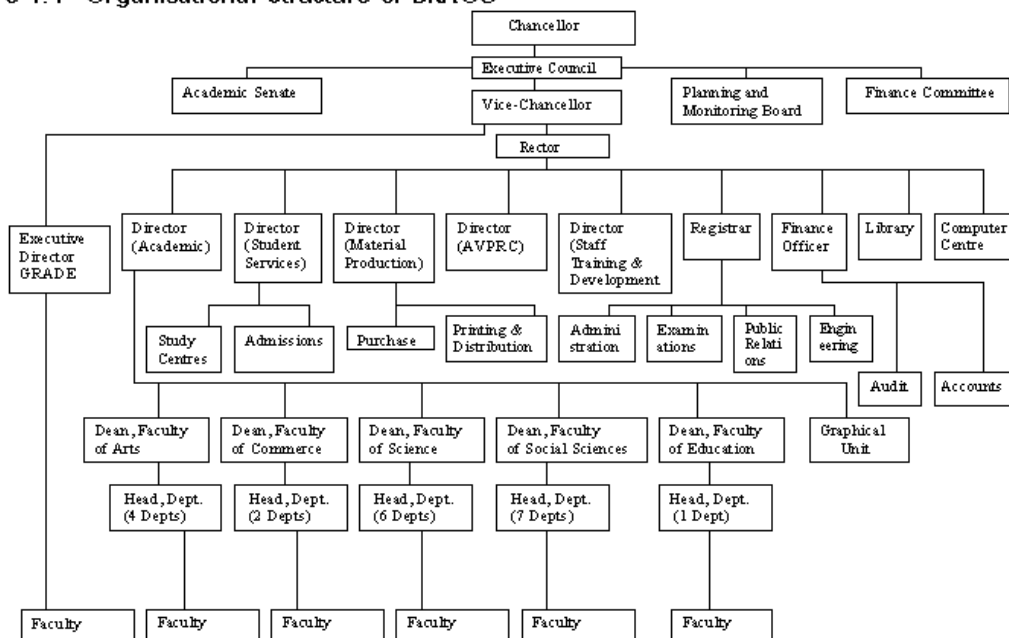
Dr. B.R. Ambedkar Open University Growth and Organizational Structure

If we look at the Indian experience with regard to the starting of the Open University, we find that the State of Andhra Pradesh is the pioneer which established the first Open University in the Country. Several factors contributed to the development of idea of an Open University in India, prior to the establishment of Dr. B.R. Ambedkar Open University (BRAOU), originally known as Andhra Pradesh Open University. In the early 1970s, an idea of set up an Open University at the national and the State levels emerged under the impact and influence of the UK Open University (UKOU).

The organization structure of the University is similar to that of the other universities in the State, through a few changes have been made in its structure to suit the character of an Open University. Governor of Andhra Pradesh is the ex-officio Chancellor of the University. The Executive Council, Academic Senate, Planning and Monitoring Board and Finance Committee are the important authorities of the University. All the executive authority is vested in the Executive Council. The Vice-Chancellor is the Chairman of the Executive Council. He is the academic and administrative head. He is appointed by the Chancellor from among the names given by a Committee specially appointed for the purpose. The term of the office of the Vice-Chancellor is three years. In addition, there are the Rector, Directors, Registrar, Deans, Heads of the Departments, Finance Officer, who are the main officers of the University. The Directorates and Faculties are the main components of University. The organisational structure of the University is given in the following figure.

* ramachandraiah.gorrepati@gmail.com

Figure 1.1 Organisational Structure of BRAOU



Science Education in BRAOU

BRAOU started offering science education in 1983. It has the distinction of offering science education through distance mode for the first time in the country. It was because of the vision of the founder Vice-Chancellor, late Prof. G. Ram Reddy, that the Science Courses could be launched in BRAOU through distance mode. The vision has been translated into a reality over these years and science education has been provided successfully by the BRAOU. But for the courage and conviction of the first and founder Vice-Chancellor, Prof. G. Ram Reddy, the Bachelor's Degree in Science (BSc) could not have been offered by the BRAOU. BSc Degree is offered in English, Telugu and Urdu media. The science subjects offered by the University include Botany, Chemistry, Geology, Physics, Zoology and Mathematics. Initially there was some scepticism regarding the offer of science education through distance mode because of specific learning components and lab-based practicals required for the programme. The experience of BRAOU reveals that the Science Courses can also be offered as effectively as any other conventional university by adopting sound academic practices and innovative teaching-learning methodologies. Though initially the University has faced certain academic and operational problems, these could be solved from time to time by initiating necessary remedial measures and changing the policies and practices to suit the requirements of different science subjects.

Enrolment of students into B.Sc., Drug Science Programme

BRAOU started offering B.Sc., Drug Science Programme since 2002-03. The following table shows the details regarding the number of students admitted in the study centres since 2002-03 academic year.

Table 1
Enrolment of Students into B.Sc., (Drug Science) Programme

S No.	Year	Study Center	Number of Students Admitted	
			2 nd year	3 rd year
1	2002-03	Hyderabad	40	-
		Kakinada	50	-
2	2003-04	Hyderabad	50	40
		Kakinada	40	50
		Goa	25	-
4	2004-05	Hyderabad	45	45
		Kakinada	20	40
		Goa	-	20
3	2005-06	Hyderabad	55	45
		Visakhapatnam	20	20
4	2006-07	Hyderabad	100	50
		Visakhapatnam	40	20
5	2007-08	Hyderabad	80	85
		Visakhapatnam	40	40
		Chandigarh	100	-
6	2008-09	Hyderabad	100	90
		Chandigarh	110	100
		visakapatnam	30	25

Collaboration with Dr. Reddy's Laboratories

Dr. Reddy's Laboratories Limited, a reputed and well-established Pharmaceutical Company approached BRAOU with a request to design and develop a customised academic programme in pharmaceutical sciences for their employee trainees to acquire higher educational qualifications in the field of pharmaceutical chemistry and related areas through open and distance education methodologies. The agreement between these two partners is: Dr. Reddy's Labs would meet the development costs of programme material and BRAOU would meet the course delivery costs of the programme.

The unique feature of BSc., Drug Science programme offered by BRAOU is that this programme is based on tailor-made courses designed keeping in view the requirements of Dr. Reddy's labs. In fact Dr. Reddy's labs approached BRAOU to help the organization by officering a customised academic programme. BRAOU developed course curriculum

accordingly. The University received applications from the Reddy's labs for designing the courses in such a way that they suit the graining needs of their in-service employees. The University is proposing to offer several such courses in future in collaboration with various organizations with diverse needs.

Programme and Fee Structure of BSc., Drug Science

The details regarding the number of courses offered during the three years study period and the fee charged in each year are furnished below:

S.No	Subject	No. of Courses		Fees * Rs
		Theory	Practicals	

Year I

1	English-Communication Skills	1	0	1200/-
2	Second Language (T/H/U/AE)	1	0	
3	Foundation Course in Science Technology	1	0	
4	Foundation Course in Social Sciences	1	0	

Year II

Course-I

Course-II

1	Chemistry	Chemistry of Atoms Elements-1 and Carbon compounds-1 + Practical	Elements-II, Carbon Compounds-II and Chemistry of Solids+ Practical	5500/-
2**	Drug Chemistry	Chemical Analysis +Practical	Microbial Bio-technology+ Practical	
3**	Drug Technology	Unit Operations+ Practical	Drug Product Machinery operations+ Practical	

Year III

Course-III

Course-IV

1	Chemistry	Elements-III Carbon - Compounds-III Physical chemistry+ Practical	Drugs, Agro-Chemicals and Environmental Chemistry+ Practical	5500/-
2**	Drug Chemistry	Instrumental Analysis + Practical	Unit Processes + Practical	
3**	Drug Technology	Manufacture of Bulk Drugs+Practical	Cosmetology+practical	

* Including Examination Fees

** New subjects for which subject wise and course wise curriculum, course titles and course content will be developed by BRAOU. The subject in II Year will be offered in Academic Year 2003-2004 and the subjects in III Year will be offered in the Academic Year 2004-2005.

BRAOU Practices for Drug Science Education

The important academic practices which contributed to the success of Science Courses in BRAOU are:

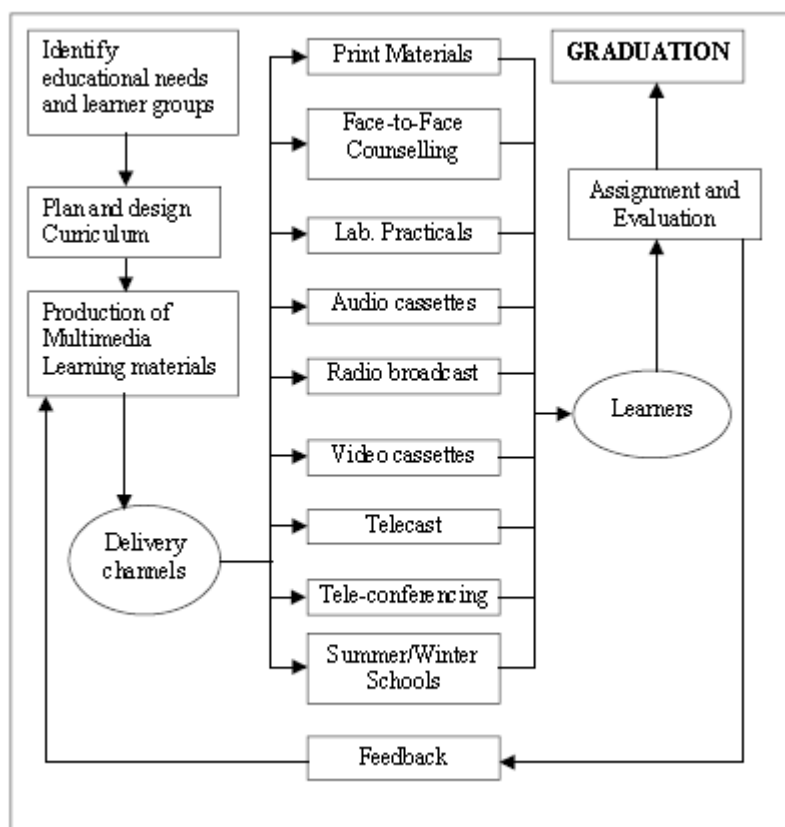
- Well defined programme development process;
- Appropriate course structure and relevant curriculum;
- Self-instructional print materials developed by course teams constituted by the University;
- Restricted admission criteria;
- Recruitment and retention of Academics with high level of expertise in distance learning and also in their own subject area;
- Regular face-to-face counselling sessions organised at the study centres;
- Compulsory component of lab-based practicals;
- Appropriate teaching-learning strategies and successful delivery of courses to students depending on their learning preferences and needs by using electronic media; and
- Maintaining the level of exit performance and academic standards which are equivalent to those of conventional universities.

Curriculum Development

The University constituted a curriculum development committee with experts from the area of pharmaceutical sciences, which include expert members from Dr. Reddy's Labs. The curriculum development committee has evolved the curriculum for two subjects, in addition to the existing four courses in chemistry. The eight courses are related to BSc (Special) Drug Science programme ie., four courses in Drug Chemistry and four more courses in Drug Technology. The expert committee identified a panel of course writers and editors who have the necessary expertise in the subject area and in writing material suited to a distant learning.

Instructional system

The instructional system used for Drug Science Course is given in the following figure,



Learner Support

Academic Counsellors

Learning through distance mode is significantly different from other conventional modes of study and, therefore, it makes different demands on students and academic counsellors. Distance learners experience a range of problems including negative effects of isolation, unfamiliarity with the process of academic study, lack of confidence in their own learning ability, lack of experience in using study skills effectively and conflicting demands on their time. In view of these problems and to neutralise the negative effects of lack of regular personal contact with the institution/teachers and peers, the University provides regular weekend counselling by appointing competent and experienced academic counsellors who are drawn from conventional universities and colleges.

The academic counsellors are selected based on their expertise in the relevant subject, teaching experience and other qualities required for teaching Science subjects. The newly recruited counsellors are provided with necessary orientation and training by organising training programmes; and workshops which are organised to update their skills in the teaching of science courses. The University also organises training programmes on methodologies to conduct lab based practicals. The senior science teachers of host colleges are given preference to others in recruiting and they are retained for a considerably long period because of the skills acquired by them in teaching distance learners.

Face-to-Face Counselling

BRAOU organises regular academic counselling sessions to its students during the weekends for BSc students. These counselling sessions are provided at the study centres and the schedules of counselling sessions are communicated to the students. The BSc students of first year are provided with counselling sessions on 21 Sundays. Similarly, counselling sessions are conducted on 24 Sundays for the second and third years of their study. Students receive counselling for six hours every Sunday. Thus science students are provided counselling for 48 hours in each subject in a year i.e. 24 hours of counselling for a paper of 100 marks weight-age besides the lab-based instruction, which is compulsory. The minimum number of students required to arrange counselling is only 5 in the case of Science subjects as against 10 students in the Arts and Commerce subjects. The academic counsellors are responsible for completing the syllabus for the batches assigned to them. During the days of counselling the students discuss their difficulties with their course materials as well as other study related problems. Counsellors also get an opportunity to check whether their students have understood the different topics included in the syllabus. During the days of counselling students are able to interact with their peers and share their learning experience for mutual benefit. The academic counsellors extensively make use of charts, specimen, models and video presentations to explain difficult and relevant concepts included in the syllabus. Thus, the academic counsellors play multiple roles and motivate the students to progress in their studies from time to time.

Laboratory-based Instruction

As mentioned earlier, laboratory-based practicals form a compulsory component in the curriculum for Science students of BRAOU. When the Science Courses were launched in BRAOU in 1983, the laboratory-based practicals were conducted for 72 hours in each subject spread over two years. These practicals were organised at the study centres by making use of the labs of colleges during the vacation time for the host colleges. The University pays the host colleges for making use of their laboratories and other infrastructure facilities including apparatus. Considering the feedback and advice from experts, the University enhanced the number of hours of practical training from 72 hour per subject to 192 hours in 1994. Out of these 192 hours, 144 hours are meant for hands-on training by the students in the laboratory and 48 hours are earmarked for demonstration experiments and the conduct of simple home experiments, which could be undertaken by the students without any need for equipment or guidance from their academic counsellors. These 144 hours of practical sessions are spread over two years with 72 hours per year, which are conducted at the end of the academic year and before the year-end examinations. In order to ensure that every student receives necessary training through hands-on experience, lab-based practicals are made compulsory and every student should attend 75 percent of the practical sessions failing which the students are not permitted to appear for the year-end examinations.

A comparison of the laboratory practicals conducted in Dr. B.R. Ambedkar Open University with conventional Universities reveals that there is a parity in the number of practical sessions and topics covered.

Another important feature of BSc programme is that practical manuals have been developed in self-instructional format for all the courses offered by the Science Faculty. These manuals are very useful for students to learn all the important topics and procedures to be observed while conducting practicals. The practical sessions are also helpful in developing a close rapport between counsellors and students, because of regular and continuous contact between them for six weeks in a year.

Practical Sessions

Twelve experiments in each paper in both second and third year papers are conducted in reputed colleges of Pharmacy selected as learning centres to provide quality training. Field visits to Drug Industries to impart Practical Training in handling Drug Product Machinery used in Manufacture of Bulk Drugs and various unit processes and operations of Drug Industry are arranged to ensure quality training in both Drug Analysis and Drug Manufacturing Methodology.

Practical Sessions Conducted in Pharmacy Colleges

Sl.No	Year	Name of the college Practical syllabus completed	No of students
1	2003-2004	(i) S.N. Vanitha College of Pharmacy, Hyderabad	30 (II yr BSc)
		(ii) College of Pharmacy Bheemavaram	40 (II yr BSc)
2	2004-2005	(i) S.N. Vanitha College of Pharmacy, Hyderabad	30+40 (II & III Yr)
		(ii) Study Centre, Kakinada	40 (III Yr)
		(iii) Goa College of Pharmacy, Goa	24 (III Yr BSc)
3	2005-2006	(i) S.N. Vanitha College of Pharmacy, Hyderabad	40+40 (II & III Yr BSc)
		(ii) V.S. Krishna College, Visakhapatnam	10+20 (II & III Yr BSc)
		(iii) Goa College of Pharmacy, Goa	20 (III Yr BSc)
4	2006-07	(i) S.N. Vanitha College of Pharmacy, Hyderabad	50+40 (II & III Yr)
		(ii) V.S. Krishna College, Visakhapatnam	25+20 (II & III Yr)
5	2007-08	(i) S.N. Vanitha College of Pharmacy, Hyderabad	45+40 (II & III Yr)
		(ii) V.S. Krishna College, Visakhapatnam	25+20 (II & III Yr)
6	2008-09	(i) S.N. Vanitha College of Pharmacy, Hyderabad	(II & III yr) 45+40
		(ii) V.S. Krishna College, Visakhapatnam	25+20
		(iii) University of Punjab	110+100

Future Plans and Directions

It is necessary for any educational institution to make an analysis of the strengths and weaknesses of any academic programme offered by it. Having served the cause of Science

education, the Faculty of Science of BRAOU has organised a two-day seminar on 21-22 June, 2002 to reflect on its own experience. Based on the deliberations in the seminar, the following suggestions were made to ensure that the quality of Science education is improved further in the years ahead.

- Revision of curriculum and course content shall be done regularly and continuously.
- The number of hours allotted for counselling and for practicals is insufficient and hence they may be increased to 30 counselling hours and 96 practical hours.
- Provision shall be made for additional counselling classes like summer schools for those who have missed at study centres.
- In each batch of practicals there shall be only 15 students. For every 15 students there must be one counsellor.
- The campus laboratories shall be further equipped and provided with permanent non-teaching staff such as Lab Assistants and Lab Attenders.
- Practical examinations shall be conducted immediately after completing the practical training classes.
- PG Programmes and Research Programmes leading to MPhil and PhD shall be introduced in all the science subjects.
- The University shall start some Vocational Programmes such as Biotechnology, Pharmaceutical Chemistry, Polymer Chemistry, Instrumentation, Bioinformatics, etc.

Conclusion

The question whether Distance Education can be used for instruction of Science and Technology Courses is no more relevant today. It is possible to use distance mode to deal with any subject/discipline, howsoever technical the subject is, by incorporating into the system the necessary non-distance education components as required for the subject. The experience the world over and also in India reveals that any subject can be offered through distance mode as effectively as any conventional mode. The experience of BRAOU in offering Science Education for twenty five years revealed that Science Programmes can be offered effectively by following sound academic practices and regulations. The practices followed in BRAOU have proved that Science Education can be offered effectively through distance mode. It has been proved by BRAOU that a technical and vocational programme like B.Sc., Drug Sciences has been offered successfully which could meet the requirements of chemical industry.

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